LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (withdrawn) The method of forming hydrogen from a gas mixture of methane and carbon dioxide comprising contacting gas said mixture with a catalyst comprising molybdenum carbide having a surface area of at least 35 m^2/g.

2. (withdrawn) The method claimed in claim 1 wherein said catalyst has a surface area of at least about 50 m^2/g.

3. (withdrawn) The method claimed in claim 1 wherein said gas mixture has a ratio of carbon dioxide to methane of from about 1 to 10 to 10 to 1 by volume.

4. (withdrawn) The method claimed in claim 3 wherein said reaction is conducted at a temperature of about 700° to about 900°C.

5. (previously presented) The method of conducting a water gas shift reaction comprising contacting a gas comprising a mixture of hydrogen, carbon monoxide and water vapor at a temperature of about 200° to 550°C with a catalyst said catalyst comprising molybdenum carbide having a surface area of at least 77 m^2/g.

6. (previously presented) The method claimed in claim 5 wherein said molybdenum carbide has a surface area greater than 90 m^2/g.

7. (withdrawn) A method of utilizing a molybdenum carbide catalyst in a reaction vessel having a controlled atmosphere comprising:

passivating said molybdenum carbide catalyst to form oxides on surfaces of said molybdenum carbide catalyst;

introducing said molybdenum carbide catalyst into a reaction vessel;

activating said molybdenum carbide catalyst by passing a carburizing gas in contact with said catalyst at an elevated temperature effective to activate said catalyst.

8. (withdrawn) The method claimed in claim 7 further comprising passing a carbon containing gas in contact with said catalyst to form a reaction whereby a said catalyst is at least partially deactivated; further comprising reactivating said catalyst by introducing a carburizing gas into said reaction vessel in contact with said catalyst at a temperature effect to reactivate said catalyst.

9. (withdrawn) A method of forming a high surface area Mo_2C comprising soaking a molybdenum compound selected from the group consisting of molybdates and oxide in a H/CO gas at 300°-400°C for 1-5 hours;

subsequently soaking said molybdenum compound in a H/CH_4 mixture for 3-5 hours at a temperature of 550°-850°C.

10. (previously presented) The method claimed in claim 5 wherein said gas comprises a mixture of hydrogen, carbon monoxide, carbon dioxide and water vapor.

11. (previously presented) The method claimed in claim 5 wherein said catalyst is subjected to an anneal in hydrogen at 55° C for at least 2 hours.

12. (previously presented) The method claimed in claim 5 wherein said catalyst is formed by soaking a molybdenum compound selected from the group consisting of molybdates and molybdenum oxide in HCO gas at 300° - 400° C for 1 to 5 hours and subsequently soaking said molybdenum compound in H/CH_4 gas for 3 to 5 hours at a temperature of 550° to 800° C.